EPA Pollution Prevention Through Nanotechnology
September 25-26, 2007
Arlington, Virginia

Altairnano
innovation at work

Nano-Based Lithium-Ion Batteries for Electric Vehicles

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With the exception of historical information, matters discussed in this presentation regarding product development, target markets, revenue and income projections, are forward looking statements that involve a number of risks and uncertainties as defined under the Private Securities Reform Act of 1995.

Presentation Outline

Nano-Based Lithium-Ion Batteries for Electric Vehicles

- Altairnano Batteries – Unmatched performance & safety
  - Introduction to Altairnano
  - Altairnano Technology and the Environment
  - Performance and feature overview
    - Power
      - Charge (Rapid Charge)
    - Cycle Life
    - Safety
    - Energy
- Applications
  - All Electric Vehicle
  - HEV
  - A new energy & power storage landscape
- Questions & answers

Altairnano - Who We Are

Altair Nanotechnologies Inc., “Altairnano”, creates and builds unique businesses. This is accomplished through “Innovation at Work” and by pioneering products with unmatched performance.

- A public company (NASDAQ: ALTI)
- An innovator in ceramic nano-materials
  - Over 30 issued patents and 100 patent applications
- Creating nano-metal oxide-based products
  - Experiencing performance never before achieved
- Large scale product manufacturing capabilities
- 130 employees with facilities in NV and IN
- Three unique and distinct business units

Altairnano's Businesses

Three unique business units, each in a distinct stage of growth and development. Altairnano's product technology creates unmatched product performance for unmet market needs.

Commercial Growth	Accelerating Growth	Incubating Growth
Altairnano Power & Energy Group	**Altairnano Materials Group**	**Altair Life Science Group**
Unparalleled performance for electrification of transportation and to improve electrical grid power	Titanium pigment & nano-structured nano-metal oxides for corrosion protective coatings, thermal barriers, and air & water purification	Engineered metal oxides and carbonates for new drug candidates, chemical delivery and biocompatible materials

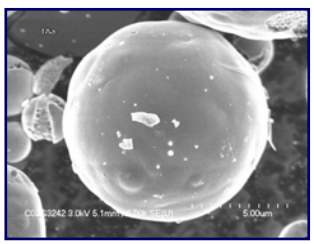
A large range of unmet market needs can be addressed by Altairnano's product technologies, which can be leveraged across the entire organization.

Unique Technology

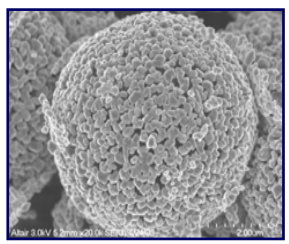
Patented, Industrial Scale Manufacturing Process

Produces Ceramic Nano-materials with
Uniquely Controlled Particle Size, Surface Area,
Morphology and Purity

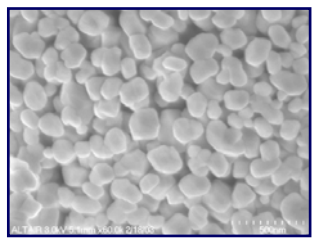
Low Cost Raw Materials → **Aqueous Solutions** → **Spray Dry** → **Heat Treat** → **Mill** → **Surface Treatment** → **High Value Products**



Hollow spheres: No crystal structure



TiNano spheres With High Surface Area



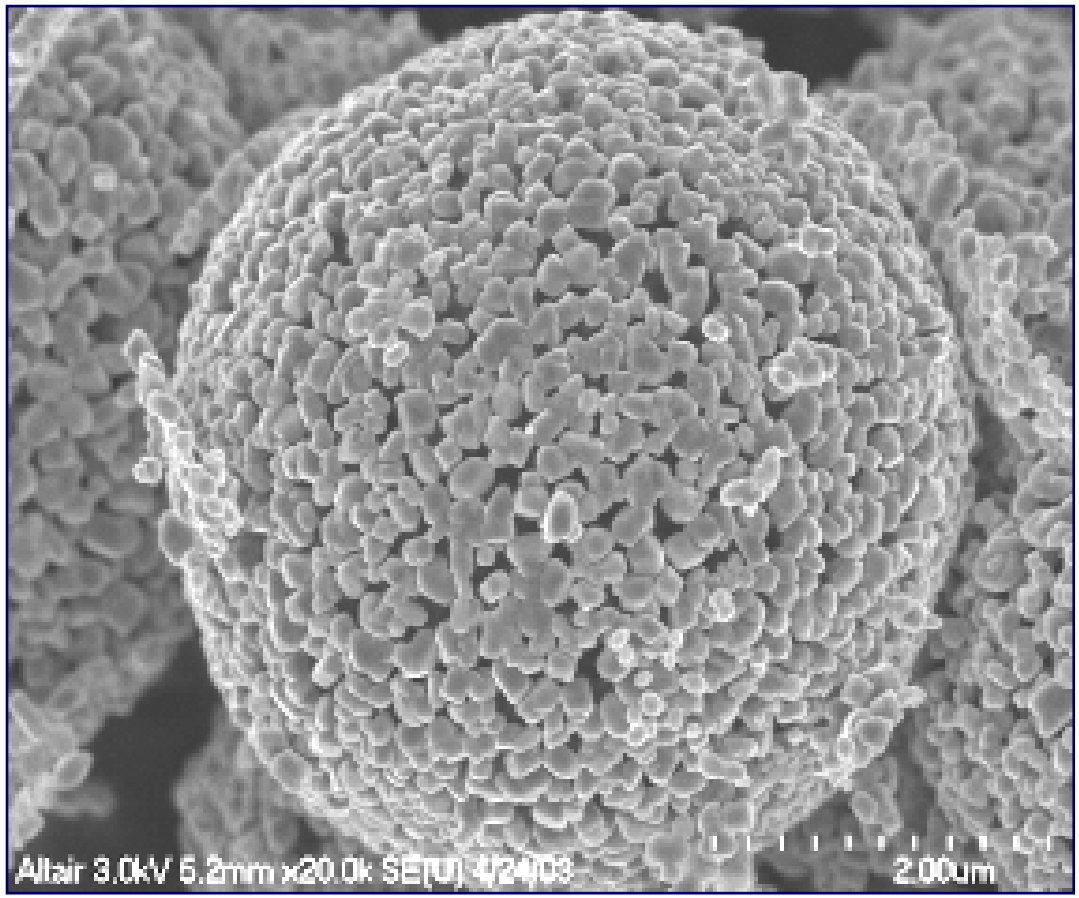
Nano-particle ceramic powder

Nano-particle ceramic powder coated with chemicals or drugs

Produces unsurpassed performance at low cost

The Nano Difference

Batteries possessing unique performance features



- Enables New Green Applications That Until Now Have Been Held Back By Inadequate Battery Technology
  - All Day, Everyday EVs
  - Long Life, Zero Maintenance Batteries For
    - Grid Load Leveling
    - Solar, Wind Energy Storage
- Altair's Technology Can Significantly Reduce Emissions Improving Air Quality.

Manufacturing capacity at 10's of tons per month

Power & Energy Group

There are three key markets: transportation, grid services & stationary power and military market applications. Altairnano's Power & Energy Group business possesses strategic partnerships for these products.

Market	Application	Partners
Transportation	Autos, trucks, buses, trains, rail and ships	PHOENIX MOTORCARS; Mobile Energy Solutions; EPRI ELECTRIC POWER RESEARCH INSTITUTE; ALCOA AFL AUTOMOTIVE; ISE CORPORATION; E-Bus; UQM TECHNOLOGIES; AV aerovironment; LIGHTNING; COBASYS; MICRO-VETT veicoli elettrici; DEPARTMENT OF THE NAVY UNITED STATES OF AMERICA
Grid Services & Stationary	Frequency regulation, backup power	AES; EPRI ELECTRIC POWER RESEARCH INSTITUTE
Military	Backup power, transportation	DEPARTMENT OF DEFENSE UNITED STATES OF AMERICA; AV aerovironment; UQM TECHNOLOGIES; U.S. DEPARTMENT OF ENERGY; U.S. AIR FORCE

Nano-Scale Technology

Why is Altairnano's a Disruptive Technology?

- No carbon anode & therefore no solid electrolyte interface (SEI)
  - Root cause of lithium ion battery catastrophic failures
  - Altairnano batteries don't burn
- Altairnano batteries have low internal impedance
  - Don't significantly heat when charged (minimal I^2R heating)
  - Take full charge, quickly, meets CARB Class III requirements
  - No other battery system is even close in performance
- Overcharge or very low SOC does not destroy Altairnano cells
  - Less protective circuitry is needed, reducing costs
- Superior cycle life
  - Full depth of discharge & recharge, even at high rates
  - At least ten times greater life than any competitive battery

Altairnano batteries are positioned between Li Ion & Super Caps

Altairnano Rate Capabilities Explained

Rate Processes Greatly Enhanced by nLTO Nano-Size

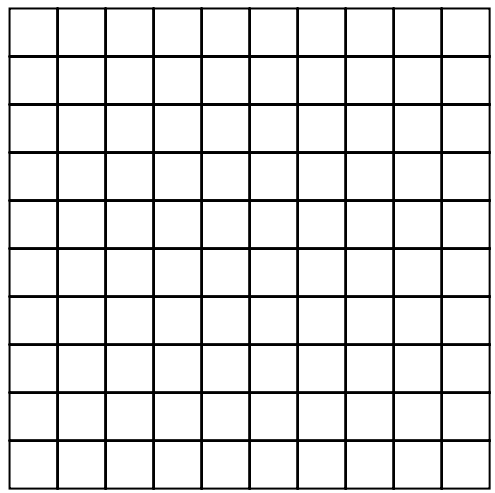
The fundamental charge process can be broken-down into the steps of:

1. lithium ion settles on the nLTO or graphite surface.
2. An electron is exchanged between the lithium ion and the nLTO or graphite (lithium is reduced)
3. The lithium atom migrates to an internal ***active site*** in the nLTO or graphite.

nLTO's Lack of SEI and Very High Relative Surface Area (Lending to Easy Access to Surface and *Active Sites*) Allows Outstanding Charge / Discharge Rate Performance

1:100 Surface Area Ratio Comparison

Graphite ~ 1m²/g

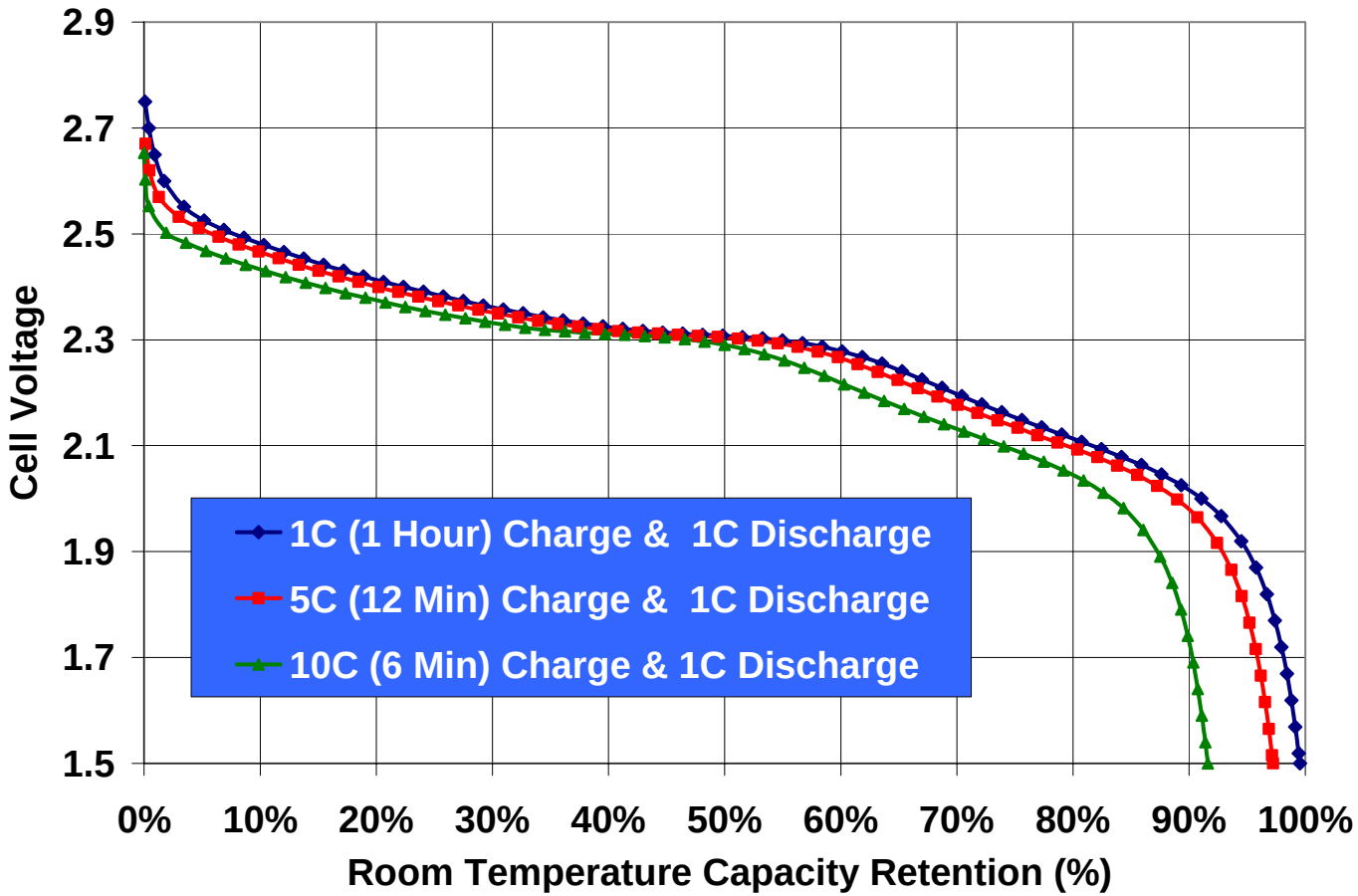


nLTO ~ 40 to 140 m2/g

Up to 2 Orders of Magnitude More Surface and no SEI

Altairnano EV Cell Charge

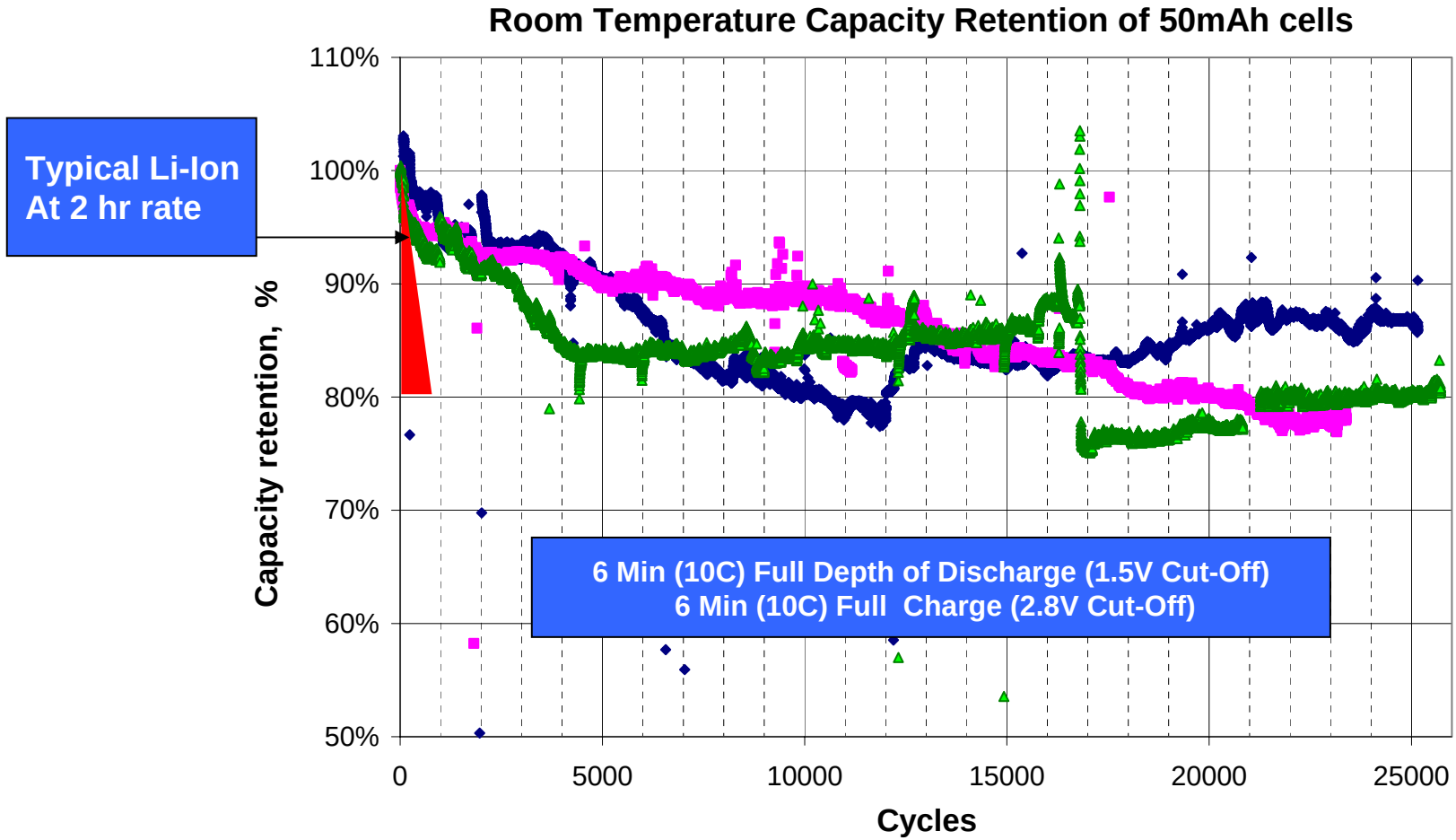
Fills to Over 90% of Charge Capacity in 6 Minutes



Cell Allows Pack Rating to ~95% Capacity in 10 Minutes

Altairnano Battery Cycle Life In the Lab

25,000 cycles versus ~750 cycles for Lithium Ion

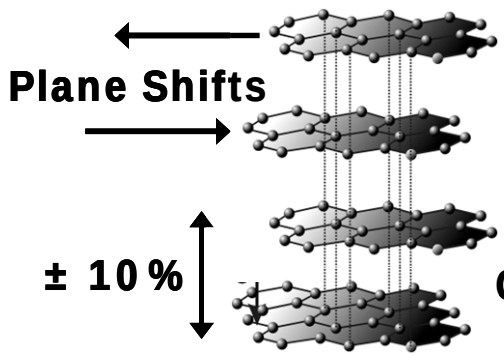


Over 30 Times the Cycle Life at 20 Times the Rate!

Altairnano Cycle Life Explained

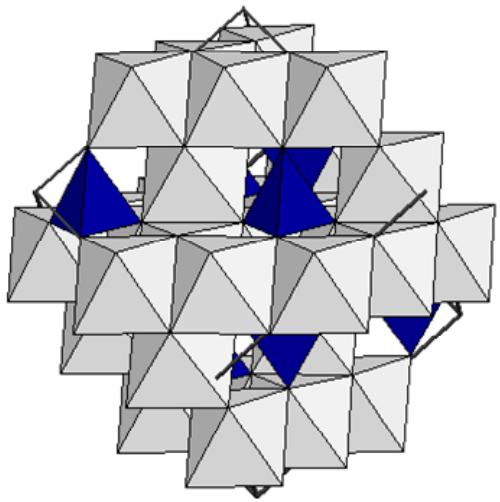
Graphite Undergoes Life Limiting Stress and Strain / Exfoliation

GRAPHITE (2D)



Battery Charge / Discharge Causes……

nLTO (3D)



…Exfoliation / Stress and Strain Severely Limiting Cycle Life

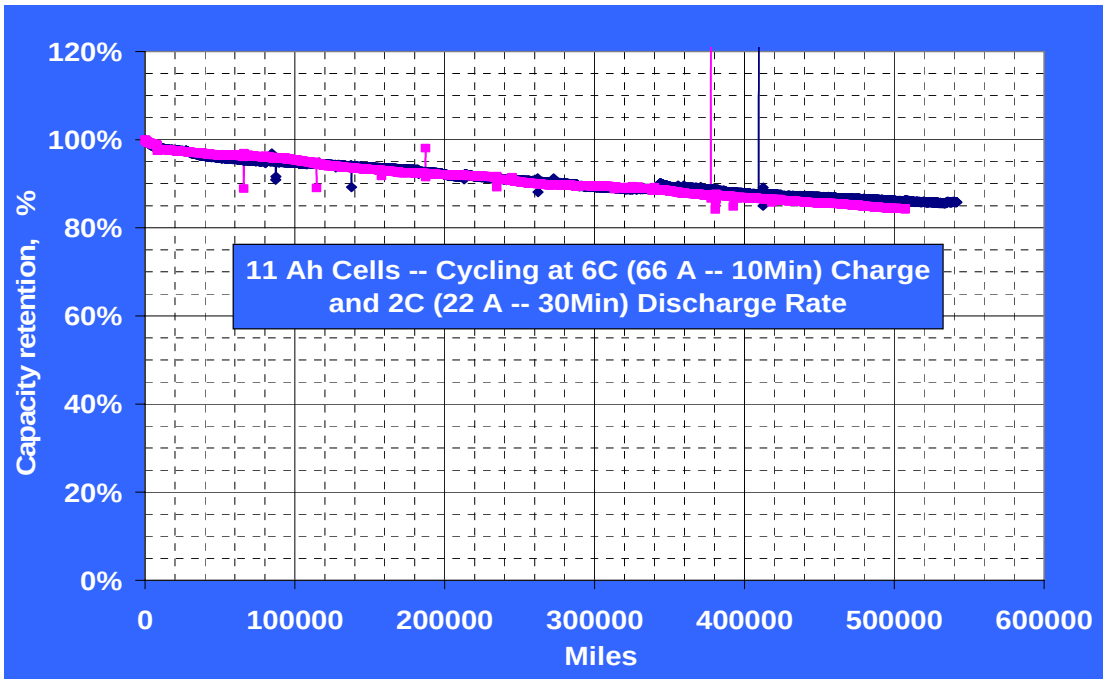
…No Exfoliation / Stress or Strain Greatly Enhancing Cycle Life

nLTO Does NOT Suffer From Life Limiting Processes

What It Means

All Electric Vehicles with Great Range and Long Life!

- Phoenix SUT travel range (designed for 130 miles/cycle)
- Using conservative assumption: 100 miles per discharge cycle
- Capable of achieving nearly 500,000 miles during battery life



Vehicle Characteristics

- Recharge time <10 min

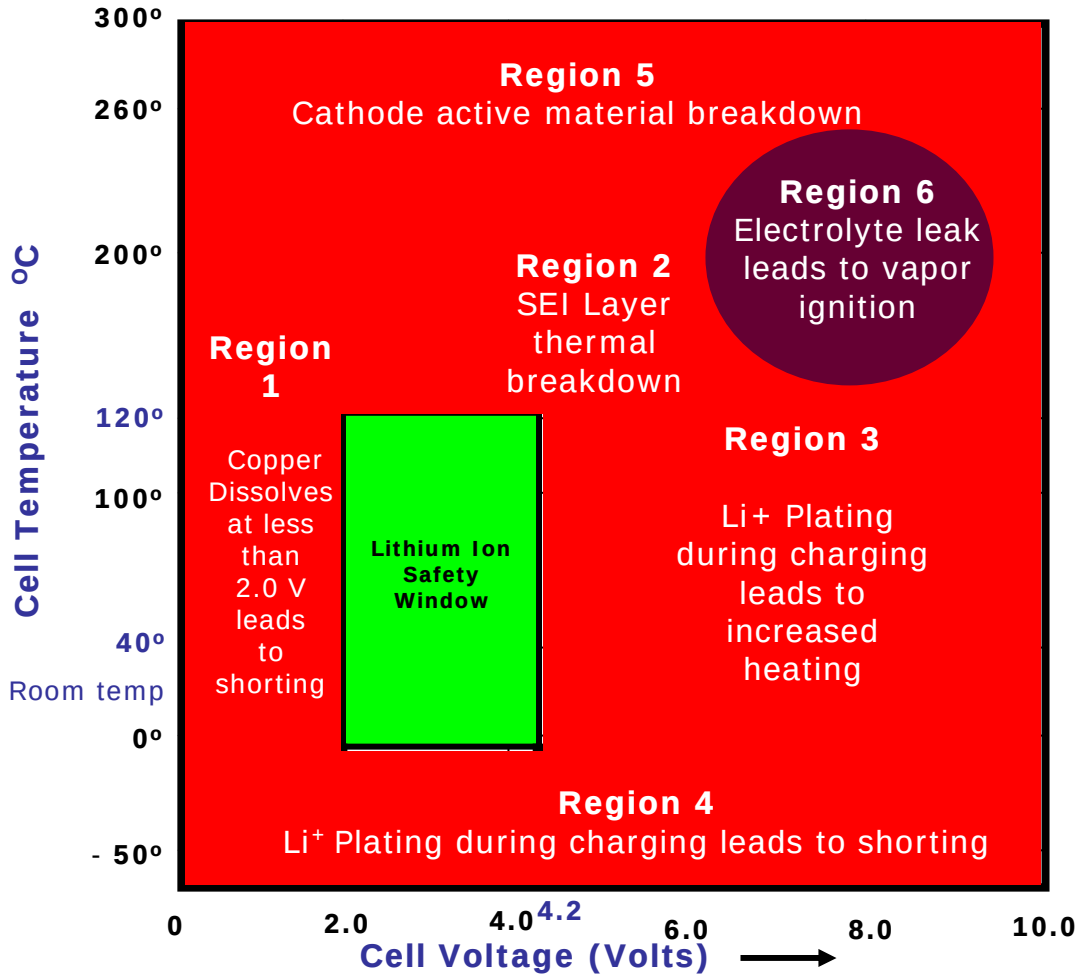
EV Costs vs ICE vehicles

- Operating costs <¼
- Maintenance costs <¼

Higher purchase costs are offset by lower operating costs...

Li Ion Battery Safety

Lithium Ion Safety Requires Control of Temperature & Voltage

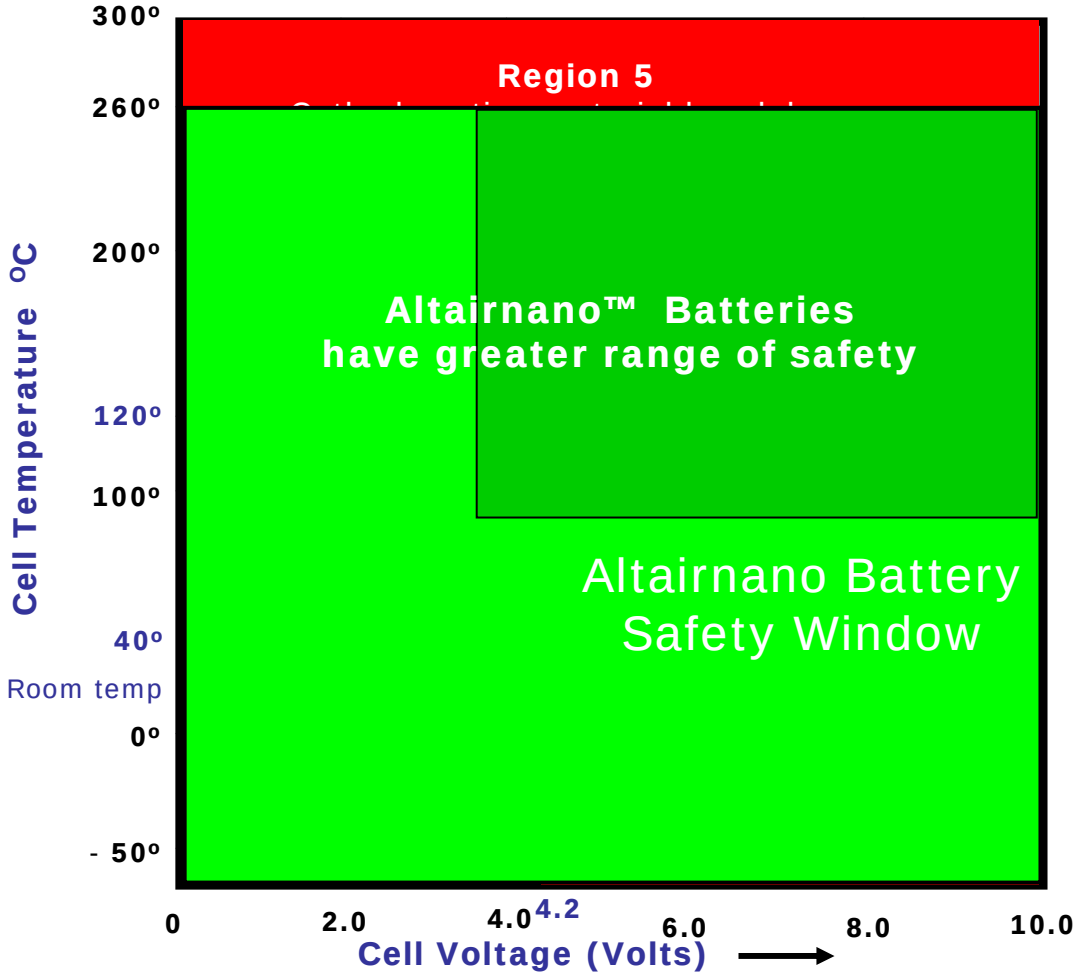


- **Region 1:** Dissolved copper re-plates on charge causing shorts
- **Region 2:** Thermal runaway virtually unavoidable once SEI layer breaks-down
- **Region 3:** Occurs at high-rates and can cause battery to explode
- **Region 4:** Lithium plating is unavoidable at cold temps; batteries can't charge
- **Region 5:** Combination of free oxygen, electrolyte, and exposed graphite leads to explosions
- **Region 6:** Runaway hazard from other regions enhances vapor exertion and ignition

Safe operation confined to relatively small range of V and T

Altairnano Products

Altairnano Products Need Less Control of Temperature & Voltage



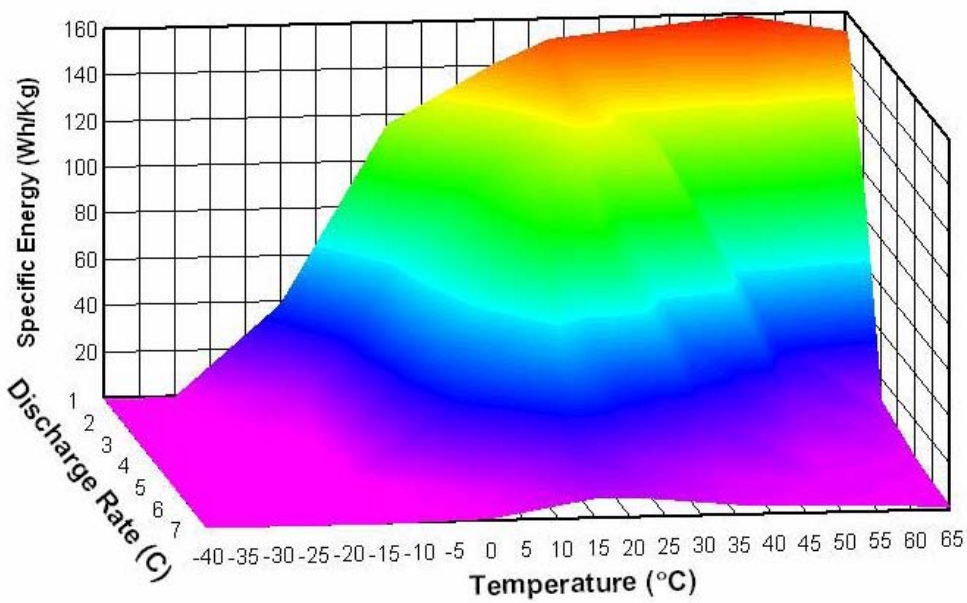
- **Region 1:** Uses no copper – batteries can be taken to very low discharge state
- **Region 2:** No dangerous SEI formed
- **Region 3:** Altairnano batteries "shut down" above 3.7V
- **Region 4:** Caused by SEI layer, Altairnano forms no dangerous SEI
- **Region 5:** Proprietary design removes this hazard
- **Region 6:** Eliminating dangers from other regions mitigates this hazard

Wide safety range for Altairnano products from -50° to 260°C

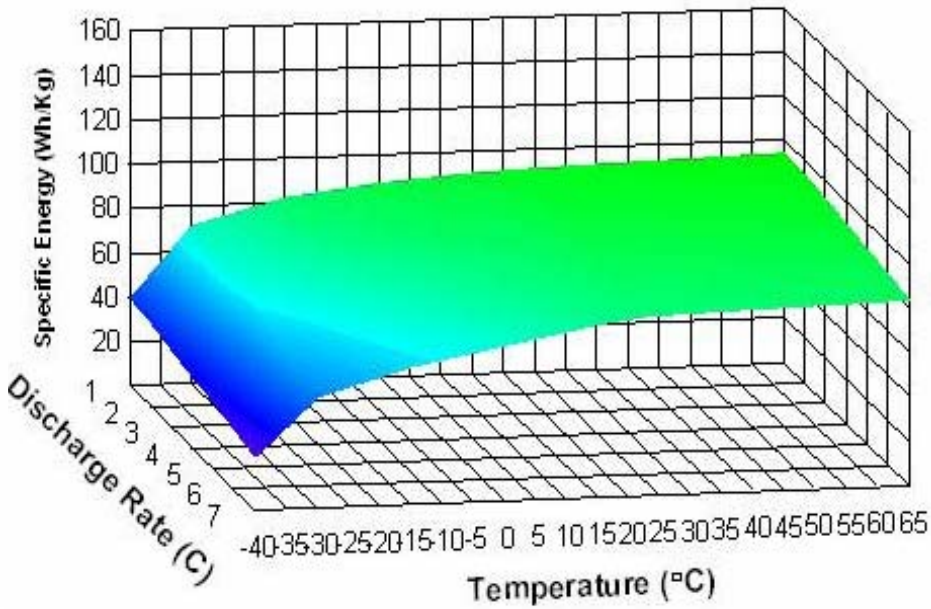
Altairnano Performance

Wide Operating Temperature Range -40°C to 65°C

18650 Performance



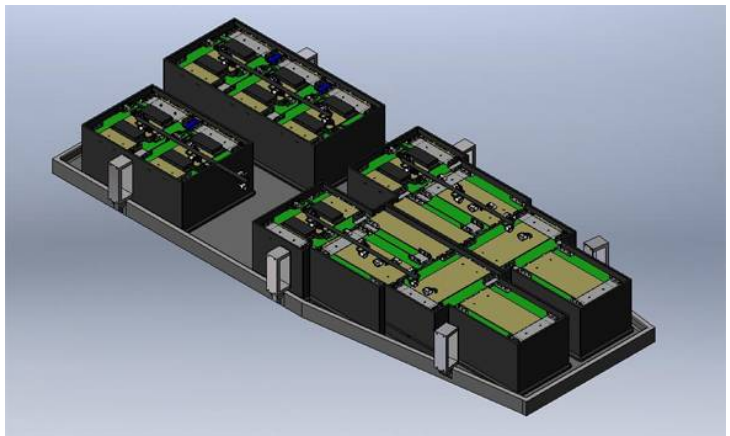
Scaled Altair n-LTO Performance



Unmatched performance at temperatures less than 0°C or at charge rates greater than 30 min

Altairnano Powered SUV

Zero Emission, Type III, Full Size, All Electric Vehicle



Altair nano POWERED

Zero Emissions.
Zero Compromises.

NOW!

The Altairnano power storage pack resides under the vehicle

Altairnano™ Batteries

Full Size 12 Volt, 90Ah, 1250Wh Batteries

Integrated Battery Management System

Proprietary Altairnano Module Controller

Monitors:
Each Cell Voltage
State-of-charge
Module Temperature

Controls:
Charge Cut-Off
Discharge Cut-Off
Cell Balancing

Connects to Power Storage Pack Master Controller

Phoenix All EV Truck

Zero Emission, Type III, Full Size, All Electric Vehicle

- Spring 2007 Availability
- Employs 28 Modules (35kWh @ 386V)
- 130 Mile Range
- <10 Minute Recharge
- >100 mph top speed capable
- 0-60 mph in <10 sec
- Targeted at Fleet Market

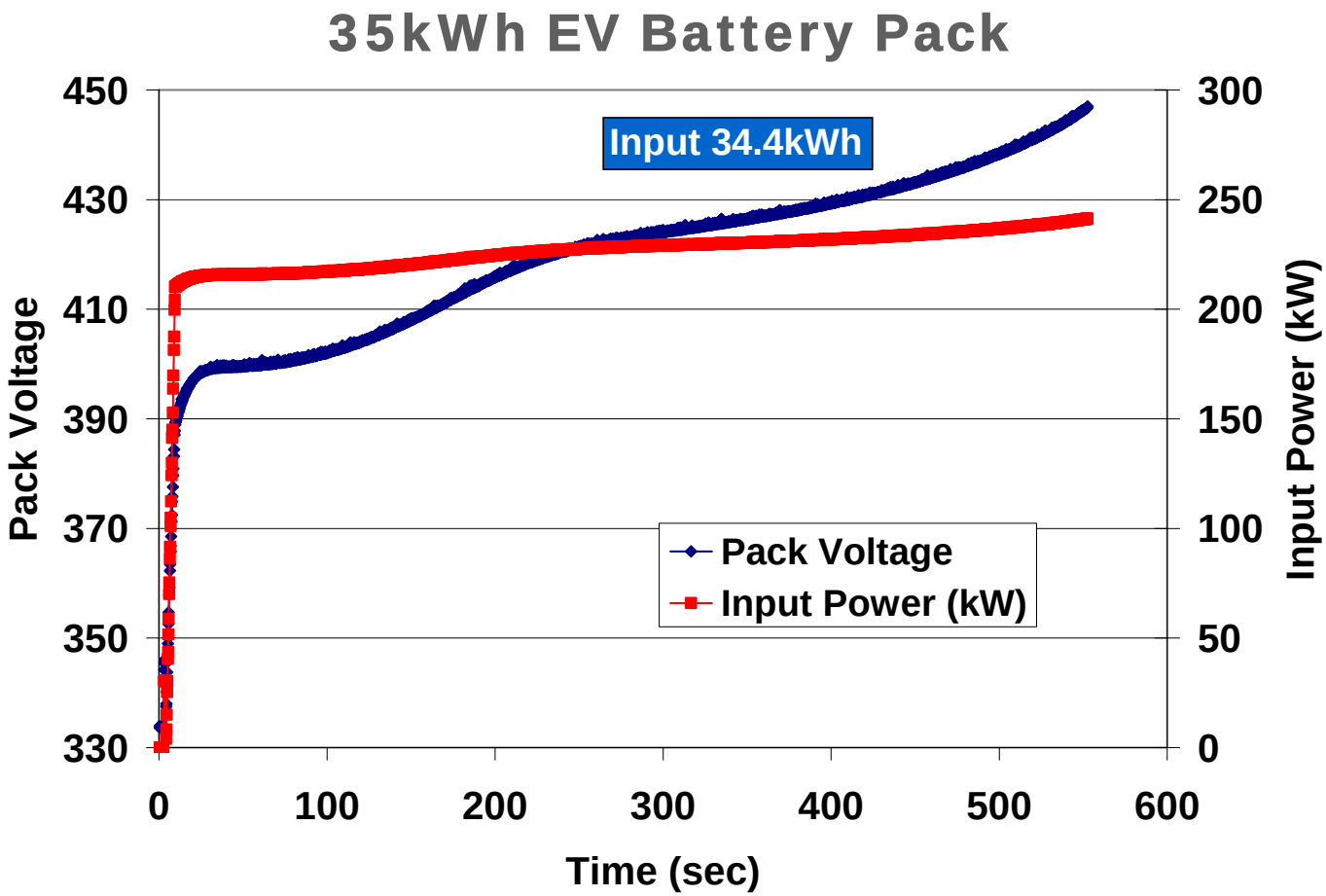
Altair nano POWERED

Zero Emissions.
Zero Compromises.

NOW!

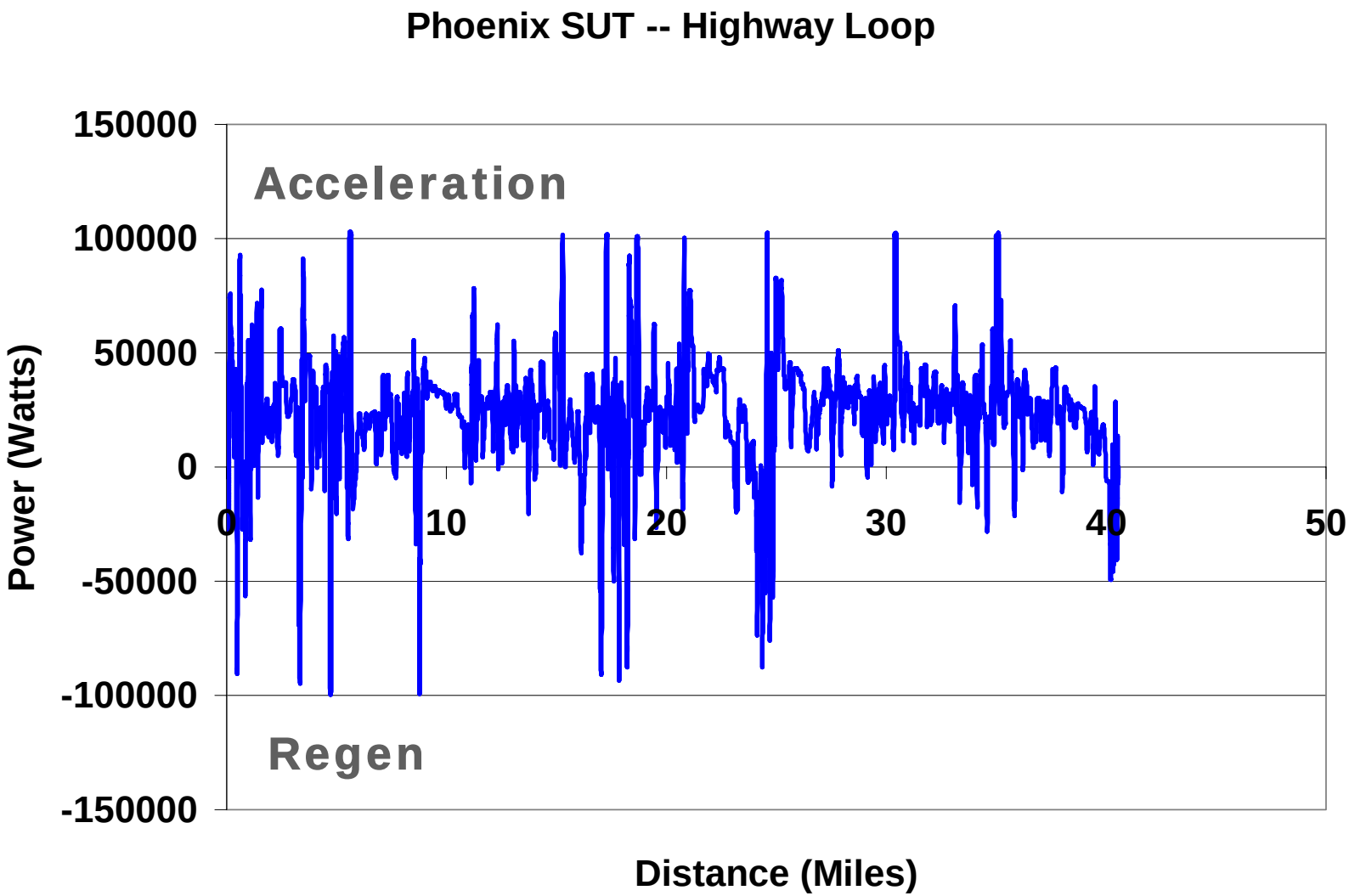
Altairnano Battery Pack 10 Minute Recharge

35kWh Rapid Charge, 540A and 210 to 240 kW In

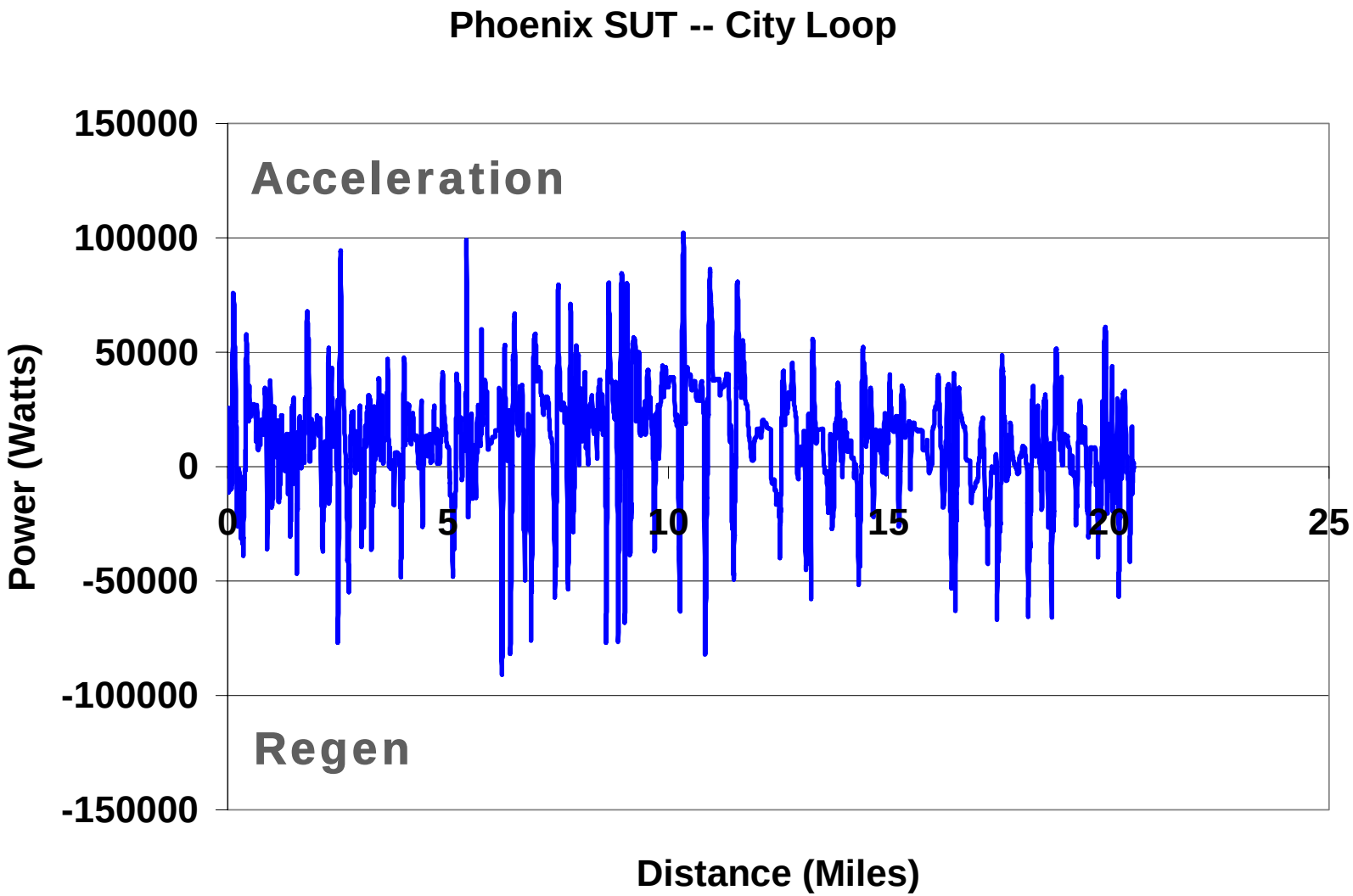


No Other Battery Technology is as Rapid Charge Capable

Phoenix Drive Data
Highway Battery Power



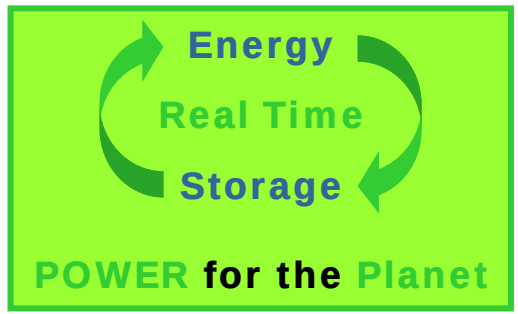
Phoenix Drive Data
City Street Battery Power



Additional Markets

Power Storage Markets, e.g. Stationary Power

- Ancillary services for the electrical grid
  - Large power storage packs (1 – 50 MW)
  - Rapid charge stations
  - Emergency power
  - Backup power
  - Wind power storage, real time
  - Real time storage or delivery of power and energy to the grid
- Partnerships in discussion
  - The AES Corporation
  - Military
  - Alternative Energy Storage
- Volume from this market may accelerate product cost reduction



Another large growth opportunity for Altairnano products

innovation at work

Remember…

Small Is Huge